

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of detecting photons, comprising the acts of:

providing a superconducting strip maintained at a temperature below its critical temperature;

electrically biasing said superconducting strip;

directing light unto said biased superconducting strip;

wherein said biasing is at a level near said superconductor strip's critical current thereby to detect a single photon incident on said superconductor strip; and

time resolving [said light] said single photon directed unto said biased superconducting strip, to resolve the incident time of the single photon to within or better than about 10 picoseconds.
2. (Original) The method of claim 1 wherein said single photon is detected by measuring an output pulse from said superconductor strip.
3. (Original) The method of claim 1 wherein said superconductor strip is of niobium nitride.
4. (Original) The method of claim 1 wherein said single the at least one photon has a wavelength between the visible and the far infrared spectral regions.
5. (Original) The method of claim 1 wherein said superconductor strip defines a meander.

6. (Original) The method of claim 2 wherein said superconductor strip has a width equal to or less than about 200 nm.

7. (Currently amended) A photon detector comprising:

a superconducting film coupled to a bias source, wherein said superconducting film is maintained at a temperature below its critical temperature and biased near its critical current, [and] wherein said superconducting film has a dimension which allows detection of a single incident photon;

a time measuring device coupled with the superconducting film, said time measuring device configured to time resolve an incident time of the single incident photon to within or better than about 10 picoseconds.

8. (Original) The photon detector of claim 7 wherein said superconducting film is of niobium nitride.

9. (Original) The photon detector of claim 7 wherein a width of said superconducting film is equal to or less than about 200nm.

10. (Original) The photon detector of claim 7 wherein said superconducting film forms a detectable resistive region upon absorption of said single incident photon.

11. (Original) The photon detector of claim 7 further comprising:

a plurality of contact pads coupled to ends of said superconducting film; and

wherein said bias source is coupled to said superconducting film at said plurality of contact pads.

12. (Original) The photon detector of claim 7 wherein said superconducting film defines a meander.

13. (Original) The photon detector of claim 11 wherein said contact pads include gold.

14. (Original) The photon detector of claim 7 wherein light is coupled to said superconducting film using an optical fiber.

15. (Original) The photon detector of claim 7 wherein light is coupled to said superconducting film through a hemispherical lens.

16. (Previously added) The method of claim 2 wherein said output pulse has a voltage greater than 1 mV.

17. (Previously added) The method of claim 1 wherein said single photon creates a resistive region extending across the width of said superconductor strip.

18. (Previously added) The photon detector of claim 7, wherein said single photon generates an output pulse from said superconducting film having a voltage greater than 1 mV.

19. (Previously added) The photon detector of claim 10, wherein said resistive region extends across said dimension of said superconducting film.

20. (Previously added) The method of photon detection of claim 1 further comprising:

directing light from at least one switching transistor unto said biased superconducting strip, said light emissions comprising at least said single photon.

21. (Previously added) The method of photon detection of claim 20 further comprising:

providing switching timing information about said at least one switching transistor.

22. (Previously added) The method of photon detection of claim 1 further comprising:

time resolving said light directed unto said biased superconducting strip to at least one nanosecond.

23. (Previously added) The photon detector of claim 7 wherein the time measuring device is configured to time resolve the detection of the single incident photon to at least one nanosecond.

24. (Previously added) The photon detector of claim 7 wherein said superconducting film is configured to receive light emissions from at least one switching transistor, the light emissions comprising at least the single incident photon.

25. (New) A method of detecting photons, comprising the acts of:

maintaining a superconducting strip below its critical temperature;

biasing said superconducting strip below its critical current;

directing at least one photon toward said superconducting strip;

providing a mirror to reflect the at least one photon unto said superconducting strip in the event that the at least one photon is not directly incident upon the superconducting strip; and

whereby the superconducting strip detects the at least one photon incident thereon.

26. (New) The method of claim 25 further comprising maintaining the superconducting strip substantially below its critical temperature such that said superconducting film is maintained in the superconducting state below its superconducting transition region.

27. (New) The method of claim 26 wherein said superconducting film comprises a niobium nitride superconducting film, and further comprising the operation of maintaining the niobium nitride superconducting film at a temperature at or below 4 Kelvin - 10 Kelvin.

28. (New) The method of claim 25 wherein said superconducting strip is deposited on a substrate defining a first side and an opposite second side, said first side having an antireflective coating, and said second side having said superconducting film deposited thereon.

29. (New) The method of claim 28 wherein said antireflective coating is arranged to face said light source.

30. (New) The method of claim 26 further comprising:

providing a cryogenic amplifier coupled with said superconducting film to amplify an output signal from the superconducting film that is a function of the detection of said one or more photons.

31. (New) A photon detector for detecting one or more photons from a light source, the photon detector comprising:

a superconducting film coupled with a substrate;

a mirror optically coupled with the superconducting film, the mirror arranged to reflect the one or more photons toward the superconducting film;

wherein said superconducting film has a dimension which allows detection of the one or more photons when said superconducting film is maintained at a temperature below its critical temperature and biased below its critical current; and

wherein the one or more photons may be directly incident upon the superconducting film or reflected off the mirror onto the superconducting film.

32. (New) The photon detector of claim 31 wherein said superconducting film is maintained at a temperature substantially below its critical temperature such that said superconducting film is maintained in the superconducting state below its superconducting transition region.

33. (New) The photon detector of claim 32 wherein said superconducting film comprises a niobium nitride superconducting film maintained at a temperature at or below 4 Kelvin - 10 Kelvin.

34. (New) The photon detector of claim 31 wherein said substrate defines a first side and an opposite second side, said first side having an antireflective coating, and said second side having said superconducting film deposited thereon.

35. (New) The photon detector of claim 34 wherein said antireflective coating is arranged to face said light source.

36. (New) The photon detector of claim 31 further comprising:

a cryogenic amplifier coupled with said superconducting film to amplify an output that is a function of the detection of said one or more photons.

37. (New) A method of detecting photons, comprising the acts of:

providing a superconducting strip maintained at a temperature substantially below its critical temperature so that the superconducting strip is in a superconducting state and below the superconducting transition region;

electrically biasing said superconducting strip;

directing light unto said biased superconducting strip;

wherein said biasing is at a level near said superconductor strip's critical current thereby to detect a single photon incident on said superconductor strip.

38. (New) The photon detector of claim 37 wherein said superconducting strip comprises a niobium nitride superconducting strip maintained at a temperature at or below 4 Kelvin – 10 Kelvin.

39. (New) A photon detector comprising:

a superconducting film maintained at a temperature substantially below its critical temperature such that the superconducting film is maintained in the superconducting state and substantially below its superconducting transition region;

said superconducting film further coupled with a bias source to bias said superconducting film below its critical current;

wherein said superconducting film has a dimension which allows detection of a single incident photon.

40. (New) The photon detector of claim 39 wherein said superconducting film comprises a niobium nitride superconducting film maintained at a temperature at or below 4 Kelvin – 10 Kelvin.